AMATEUR SATELLITE REPORT

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Team To Assess AO-10 Operations Prospects

With the period of greatest danger now passed, AMSAT engineers and managers were assessing AMSAT OSCAR 10's condition at press time in preparation for a possible return to operations in early May. The satellite had been unavailable for use for two months due to the poor sun angles and the inability to adjust the satellite's spin axis since the computer failed last autumn.

With the return of better sun angles, prospects are thought to be reasonably good the spacecraft would be returned to service on or about May 1. The evaluation was incomplete at press time but preliminary indications were thought to be favorable for an early May release of AO-10 for Mode B operations.

AMSAT officials are optimistic there will in fact be additional service provided by AO-10 in the months to come. Indeed, except for the radiation damaged computer, the balance of the spacecraft hardware seems to be in excellent condition. The primary batteries show no serious signs of weakness and the solar cells are running well too.

Although optimism characterizes the mood, caution must be exercised as well AMSAT officials emphasized. If the spacecraft is stressed prior to the batteries regaining full charge, serious damage could ensue. Thus, all are urged to stand by for the official word before commencing AO-10 use. After the word is given for use, uplink power should be employed at the absolutely lowest levels. QRO operations are especially undesirable while the spacecraft is recovering from it's two-month hibernation period.

When the spacecraft is released for operations, strict operating times will need to be observed. Since the IHU is inoperative, the Mode B transponder may be on continuously. This means that unusually high levels of user cooperation will be necessary to curtail operations at the appointed time if battery depletion and destruction is to be avoided.

Watch for important announcements in the AMSAT News Service bulletins.

Dayton Hamvention Event Sparks Renewed Interest

The high point of AMSAT's annual convention calendar came on the weekend of April 24-27 when a team of experienced AMSAT leaders joined with an enthusiastic membership to again make the Dayton Hamvention a rousing success. Besides a lively and brisk pace at the AMSAT booth, a packed house for the Saturday AMSAT forum reflected the continued high interest in satellite topics by Amateurs at large.

New introductions of software included an updated version of WØSL tracking program for the IBM PC. The designer, Roy Welch, WØSL, was on hand to explain his program to the fascinated crowd. The new WØSL program was integrated with the new Encomm rotor system to provide a complete graphics-autotrack system which not only shows you where the satellites are, but automatically points your antennas in the right direction to track them.

On Saturday afternoon, AMSAT sponsored a two-hour forum covering everything from getting started on OSCARs to the exciting new Phase 4 program. AMSAT's Executive Vice President John Champa, K8OCL, led off with the beginner's topics. He was followed by President Vern Riportella, WA2LQQ, who gave a slide presentation prepared by WD4FAB on the new Phase 4 program. A packed house of well over 200 attended the forum.

Handling booth traffic were Vice President of Field Operations Mike Crisler, N4IFD, Keith Pugh, W5IU, Larry Koziel, K8MU, George, WT4X, Roy, WØSL, and many others. Helping set up the booth and getting things organized was Bob Rogers, W8JLE.

Photos next time.

Science teacher Herb Lapp, N2GQ, shows some of his students at Washington Township High School (NJ) the track OSCAR will follow on its next pass. Using the globe adds a third dimension to the discussion, allowing students to better visualize OSCAR's orbit. Lapp also applied for and received a Teacher Mini Grant from the New Jersey Department of Education and built a fine Mode A satellite ground station for use in his classes.

Additional Delays Plague Ariane Launch Schedule

The problem-plagued European Space Agency Ariane launch schedule seems to have been delayed still further. Plans for a V-19 launch early this year have been repeatedly postponed by cascading problems all associated with the advanced cryogenic third stage engine, the HM7-B engine built by the French concern, SEP.

Launches have been suspended since May, 1986, following the loss of the V-18 mission and its payload due to a third stage engine ignition malfunction. The second major loss due to a third stage ignition problem, the V-18 loss triggered a major re-evaluation of the third stage engine ignitors. The chief result was a complete redesign and upgrade of the third stage ignitor. The redesigned ignitor was approved earlier this year and it seemed things were getting back on track as far as getting the V-19 mission launched by May, 1987.

But, as reported two weeks ago, a mishandling incident at the SEP vacuum chamber testing facility at Vernon, France, caused unacceptable damage to the third stage engine intended for use on V-19. The third stage engine for the V-20 launch was then brought up for qualification tests to replace the damaged engine in order to maintain the June/July hoped-for launch of V-19.

Now, however, a further complicating failure incident has marred the return to active status of the Ariane program. According to Aviation Week magazine, the new delays could result from the overheating of a third stage turbopump bearing system detected during a calibration run for the engine that was undergoing qualification for the V-19 flight. This engine was itself a replacement for the one previously damaged in the vacuum chamber incident.

Where this leaves the Ariane launch schedule, on the one hand, is largely a matter of speculation. Prior to this latest setback, Arianespace had been targeting V-19 launch for the end of June or early July. That hardly seems attainable given the current situation. It is unknown at this juncture if another third stage engine can be brought forward or if either of the two damaged engines can be repaired promptly.

Where this leaves AMSAT and its Phase 3C launch prospects, on the other hand, is equally puzzling. One could argue equally well, it seems, that the current V-19 situation could both accelerate or further retard the V-21 launch on which AMSAT's Phase 3C is manifested. The reason the answer is not straightforward lies in the high number of variables and extraordinary pressures being brought to bear on Arianespace to remedy the situation. With a launch stand-down now certain to exceed a year from the V-18 failure, hundreds of millions of dollars in payloads in the launch queue, owners of these payloads are employing every device at their command to alter the launch sequence in their favor. Add to this the difference in launchers, that is, the Ariane 3 versus the Ariane 4, the need to get the second launch pad configured for Ariane 4 and more variables than one can name and it's apparent why making predictions is a risky business.

Nevertheless, AMSAT continues to hope for the launch of its Phase 3C aboard V-21 by early 1988. The spacecraft is in West Germany at present undergoing some final upgrades (including soon, the new, radiation hardened IHU memory) prior to closeout. Once the launch date for V-21 is set, Phase 3C will itself be placed on a close-out schedule. AMSAT's general plan calls for an early 1988 launch although we could respond to a call-up for launch as soon as this autumn if required.

Kvant Docks With Mir After EVA To Remove "Bag"

The two Soviet Cosmonauts aboard the Mir Space Station performed a successful extravehicular activity April 12 during which they removed a cloth object which had lodged in the docking mechanism between the Kvant astrophysical module and the main Mir bulkhead. The object was said to look like a small white bag such as may have contained parts of have been a protective covering which had not been removed by the ground crew prior to launch. The bag apparently caused the abortive docking attempt April 9 following launch of Kvant April 5.

The 3 hour and 40 minute EVA had Cosmonauts Romanenko and Laveikin manually separate the 11 ton Kvant from Mir by pulling them more than a foot apart. The docking was finally completed by ground controllers by remote control. The Mir space station ensemble is now growing and is very easily visible from the ground with the naked eye in proper lighting conditions. The ensemble now consists of the Soyuz TM spacecraft, the Mir space station and the KVANT astrophysics module. Best viewing time is from 15 minutes to about 90 minutes past dusk and from 90 minutes to 15 minutes prior to dawn. The Mir Cosmonauts continue to use the powerful FM transmitter on 143.625 MHz for communications. It makes for interesting, easy listening even on an HT.

Amateur Satellite Frequency Guide

Including UO-9, AO-10, UO-11, FO-12, RS-9 and P3C

Produced by AMSAT North America

Rev 1.2 26Apr87

UoSAT OSCAR 9

Summary: Downlinks on 2 meters, 70 cm and 13 cm; no uplinks since this is primarily an educational and research spacecraft. Other downlinks at 7.050, 14.002, 21.002 and 29.502 MHz which are part of the HF propagation experiment.

VHF downlink: 145.825 MHz
UHF downlink: 435.025 MHz
UHF downlink: 2401. MHz

Source: UoSAT Spacecraft Data Booklet, May 1986, University of Surrey, England

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UoSAT OSCAR 11

Summary: Downlinks on 2 meters, 70 cm and 13 cm; no uplinks since this is primarily an educational and research spacecraft.

VHF downlink: 145.825 MHz
UHF downlink: 435.025 MHz
UHF downlink: 2401.5 MHz

Source: UoSAT Spacecraft Data Booklet, May 1986, University of Surrey, England

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AMSAT OSCAR 10

Summary: Mode B: 70 cm up; 2 meters down Mode L: 24 cm up; 70 cm down Beacons: Mode B: General Beacon 145.810 MHz; Engineering Beacon 145.987 MHz Mode L: (No longer operational)

Mode B:	Uplink (MHz)	Downlink (MHz)	
		145.987	Engineering Beacon
	435.030	145.975	Passband limit, upper
	435.045	145.960	General use limit, upper
	435.050	145.955	
	435.060	145.945	
	435.070	145.935	
	435.080	145.925	
	435.090	145.915	
	435.100	145.905	
	435.105	145.900	Nominal passband center
	435.110	145.895	
	435.120	145.885	
	435.130	145.875	
	435.140	145.865	
	435.150	145.855	
	435.160	145.845	General use limit, lower
	435.180	145.825	Passband limit, lower
		145.810	General Beacon

Mode L: (No longer operational)

Source: Amateur Satellite Report 60/61, August 1, 1983 as amended

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FUJI OSCAR 12

Summary: Mode JA: 2 meter uplink; 70 cm downlink Mode JD: 2 meter uplink; 70 cm downlink Beacon: 435.795 MHz

	Uplink (MHz)	Downlink (MHz)	
Mode JA:			
	145.900	435.900	Passband limit, upper
	145.910	435.890	
	145.920	435.880	
	145.930	435.870	
	145.940	435.860	
	145.950	435.850	Passband center
	145.960	435.840	
	145.970	435.830	
	145.980	435.820	
	145.990	435.810	
	146.000	435.800	Passband limit, lower
		435.795	Beacon
Mode JD:	145.850	435.910	Channel 1
	145.870	435.910	Channel 2
	145.890	435.910	Channel 3
	145.910	435.910	Channel 4
	(Downlink for all 4 channels is 435.910)		

Source: Amateur Satellite Report 119, March 12, 1986 and Amateur satellite Report 130, August 18, 1986 JAS-1 Handbook, JARL, August 1985

Radio Sputnik 9

(Formerly deignated RS-10)
Estimated Luanch Date: Mid-1987

(PRELIMINARY ESTIMATES)

As of April 1987 Summary: Mode A: 2 meters up; 10 meters down Mode K: 15 meters up; 10 meters down Mode T: 15 meters up; 2 meters down Robot T: 15 meters up; 2 meters down Beacons: Mode A Beacon: 29.402 MHz Mode T Beacon: 145.957 and 145.997 MHz

	Uplink (MHz)	Downlink (MHz)	
Mode A:			
	145.860	29.360	Passband limit, lower
	145.870	29.370	
	145.880	29.380	Passband center
	145.890	29.390	
	145.900	29.400	Passband limit, upper
		29.402	Beacon
Mode K:	21.260	29.460	Passband limit, lower
	21.270	29.470	
	21.280	29.480	Passband center
	21.290	29.490	
	21.300	29.500	Passband limit, upper
Mode T:		145.957	Beacon
	21.260	145.960	Passband limit, lower
	21.270	145.970	
	21.280	145.980	Passband center
	21.290	145.990	
	21.295	145.995	Passband limit, upper
		145.997	Beacon
Robot T:	21.140	145.957	or 145.997 MHz Single channel

Source: Amateur Satellite Report 136, November 17, 1986 and Amateur satellite Report 140, January 12, 1987

Phase 3C

Estimated Launch Date: Early 1988
(PRELIMINARY ESTIMATES)
As of April 1987

Summary: Mode B: 70 cm up; 2 meters down Mode JL: 24 cm and 2 meters up; 70 cm down Mode S: 70 cm up; 13 cm down RUDAK: 24 cm up; 70 cm down Beacons: Mode B: General Beacon 145.8125; Engineering Beacon 145.975 Mode JL: General Beacon 435.650; Engineering Beacon 435.675 Mode S: 2400.640

	Uplink (MHz)	Downlink (MHz)	
Mode B:		145.975	Engineering Beacon
	435.425	145.975	Passband limit, upper
	435.435	145.965	
	435.445	145.955	
	435.455	145.945	
	435.465	145.935	
	435.475	145.925	
	435.485	145.915	
	435.495	145.905	
	435.505	145.895	Passband center
	435.515	145.885	
	435.525	145.875	
	435.535	145.865	
	435.545	145.855	
	435.555	145.845	
	435.565	145.835	
	435.575	145.825	Passband limit, lower
		145.8125	General Beacon

Mode JL: L Uplink	J1 Uplink	Downlink	J2 Uplink	
1269.325		435.975		L Passband limit, upper
1269.330	145.820	435.970	144.440	J Sub-band limit, upper
1269.340	145.830	435.960	144.450	
1269.350	145.840	435.950	144.460	J Sub-band center
1269.360	145.850	435.940	144.470	
1269.370	145.860	435.930	144.480	J Sub-band limit, lower
1269.380		435.920		
1269.390		435.910		
1269.400		435.900		
1269.410		435.890		
1269.420		435.880		
1269.430		435.870		
1269.440		435.860		
1269.450		435.850		L Passband Center
1269.460		435.840		
1269.470		435.830		
1269.480		435.820		
1269.490		435.810		
1269.500		435.800		
1269.510		435.790		
1269.520		435.780		
1269.530		435.770		
1269.540		435.760		
1269.550		435.750		
1269.560		435.740		
1269.570		435.730		
1269.575		435.725		L Passband limit, lower
		435.675		Engineering Beacon
		435.650		General Beacon

	Uplink	Downlink	
Mode S:		2400.640	Beacon
	435.610	2400.695	Passband limit, lower
	435.615	2400.700	
	435.620	2400.705	
	435.625	2400.710	Passband center
	435.630	2400.715	
	435.635	2400.720	
	435.640	2400.725	Passband limit, lower
RUDAK:	1269.675	435.675	Single channel

Source: AMSAT DL, DJ5KQ, DJ0HC/KE6MN, KØRZ

Russian Satellite Claimed Launch-Ready

(Translated from *Sovetskaya Rossiya*, March 22, 1987, No. 67)

Sovetskaya Rossiya has reported on the opening of a central fair and exhibition of young people's scientific- technical works . . . Yevgeniy Vedenenkov, head of the scientific research laboratory of space communications of the Central Committee of the All-Union Volunteer Society for Assistance to the Army, Air Force and Navy, filed the radio station's first report:

"Your newspaper in the past has reported on artifical Earth satellites developed by radio amateurs [he said]. Today I'd like to report the latest news. Two more of these amateur-radio satellites, "Radio-10" and "Radio-11", will be launched into space in less than two months.

"Radio apparatus for these satellites was built in the volunteer laboratory of space communications at the Cosmonautics Museum Imeni Tsiolkovskiy in Kaluga. The chief designer was Aleksandr Popkov, who is the leader of a team of assemblers at the Kaluga Electromechanical Equipment Plant. The quality of workmanship and original design solutions of this equipment would do credit even to a reputable design bureau. Radio repeaters, a telemetry system, and a radio robot with a huge memory are to be installed on the new satellites."

"I might add that apparatus for communicating via the satellites is now ready in our laboratory," said Nikolay Vyachin, a resident of Tashkent, joining the report. "Alik Kusnirov, a science associate of the Uzbek State Committee on Hydrometeorology and Monitoring of the National Environment, developed this apparatus, which is called 'Nartsiss'. It is essentially a miniature ground satellite-communications station of the 'Orbita' type, only many times smaller.

"Imagine a small box about the size of a carton of cigarettes. Four extendable antenna 'whiskers' are installed in the upper part of this box. You direct them at the point in the sky where a satellite is to appear and hear its signal in earphones or through a speaker. You then have only to press the button that says 'transmit', and your correspondent at the other end of the country will receive your radio message. With the aid of Kushnirov's apparatus, someone standing on a street in Moscow, for example, can in fact communicate with someone on Sakhalin Island."

FO-12 Mailbox Operation Expected On-Line Soon

Unofficial reports from Japan suggest work is progressing with considerable intensity aimed at getting the FO-12 Mode JD flying mailbox feature up and running. FO-12 operating schedules have been mysterious at best for the last two to three months. Word has it that some progress is being made and that the mailbox could be tested during May or early June. Once this happens, a regular operating schedule may be announced reducing some of the confusion about what to expect and when to expect it.

Voyager QSLs Now Available

QSL cards confirming listener reports of the 'round the world flight of the aircraft Voyager are now available according to John Gayman, WA3WBU. John says he sent for his QSL card just after the completion of the historic flight last December and that he got his card earlier this week. It's a beautiful, full-color card showing the Voyager and the chase plane on the final approach, John says. It's personally signed by Dick Rutan and Jeana Yeager.

To get a QSL, send a SASE to the following address: Voyager Aircraft, Inc., c/o Dick Rutan and Jeana Yeager, Hanger 77 Airport, Mojave, CA 93501

John included a description of their reported position, frequency of reception and a summary of the conversation monitored. John concludes that it's "a beautiful, one-of-a-kind QSL."

News From Surrey

G3YJO, G0/K8KA and G8VLY have recently returned from Pakistan where they spent three weeks setting up two experimental UoSAT groundstations — one at the Punjab University (Lahore) and the second at the Space & Upper Atmosphere Research Commission (Karachi). The stations will provide facilities for students to undertake projects associated with the two UoSAT spacecraft and will be active on the UO-11 Digital Communications Experiment using the amateur callsigns AP2PUL and AP2SUP. It is anticipated that radio amateurs at these stations will be active on FO-12 and AO-10 before long.

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Short Bursts

- Astronaut Dr. Tony England, WØORE, will be the special guest speaker at AMSAT's Fifth Space Symposium and Annual Meeting at the Southfield Hilton (near Detroit) this November 7.
- Last month's rumors of a launch of RS-9 have now quieted down to a watch-and-wait regime as it appears it will become the newest Amateur Radio Satellite in May or June. Formerly called RS-10 until the original RS-9 was "postponed indefinitely" for unspecified reasons, the new RS-9 will contain four modes: A, K, T and Robot T. Frequencies were published in *ASR* -140.

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